

TABLE OF CONTENTS

| | |
|--|------|
| EXECUTIVE SUMMARY | ES-1 |
| TABLE OF CONTENTS | i |
| LIST OF APPENDICES | ix |
| LIST OF FIGURES | x |
| LIST OF TABLES | xi |
| LIST OF ACRONYMS | xii |
| | |
| CHAPTER 1. INTRODUCTION | 1-1 |
| NEED FOR THE COMPREHENSIVE STUDY | 1-1 |
| THE FLOODS OF 1997 | 1-2 |
| CHANGES IN PUBLIC PRIORITIES | 1-3 |
| FLOODPLAIN FUNCTION | 1-3 |
| THE COMPREHENSIVE STUDY | 1-4 |
| STUDY AUTHORITY AND FUNDING | 1-4 |
| State Study Authority | 1-4 |
| Federal Study Authority | 1-5 |
| Study Funding | 1-5 |
| STUDY SCOPE | 1-6 |
| MISSION STATEMENT | 1-6 |
| PRELIMINARY PLANNING OBJECTIVES | 1-6 |
| STUDY AREA AND PROBLEM IDENTIFICATION AREA | 1-6 |
| The Watershed | 1-7 |
| Problem Identification Area | 1-7 |
| STUDY APPROACH AND PHASING | 1-8 |
| Study and Implementation Priorities | 1-8 |
| Study Phasing | 1-8 |
| Phase I | 1-8 |
| Phase II | 1-8 |
| Programmatic Authorization and Phased Implementation | 1-9 |
| “Spin Off” Projects Identified During the Study | 1-10 |
| Early Implementation Projects | 1-10 |
| GUIDING POLICIES AND PRINCIPLES | 1-10 |
| Compatibility with Other Programs | 1-11 |
| Watershed Context | 1-12 |
| Systems Integration | 1-12 |
| Economic Stability | 1-12 |
| Ecosystem Approach | 1-12 |

| | |
|---|------|
| Structural and Nonstructural Measures | 1-14 |
| Floodplain Management | 1-14 |
| STUDY PARTICIPATION AND COORDINATION | 1-14 |
| INTERAGENCY COMPREHENSIVE STUDY MANAGEMENT | 1-15 |
| Executive Committee | 1-15 |
| Study Management and Execution | 1-16 |
| PUBLIC INVOLVEMENT | 1-16 |
| Technical Support Groups | 1-18 |
| Policy Focus Groups | 1-19 |
| Local Support Groups | 1-19 |
| | |
| CHAPTER 2. HISTORY OF THE SACRAMENTO AND SAN JOAQUIN RIVER BASIN | 2-1 |
| GENERAL OVERVIEW | 2-1 |
| PHYSICAL GEOGRAPHY | 2-2 |
| HYDROLOGY, GEOMORPHOLOGY, AND VEGETATION | 2-3 |
| THE SACRAMENTO RIVER BASIN | 2-4 |
| THE SAN JOAQUIN RIVER BASIN | 2-7 |
| HISTORY OF WATER RESOURCE DEVELOPMENT IN THE CENTRAL VALLEY | 2-9 |
| THE CENTRAL VALLEY PROJECT | 2-9 |
| THE STATE WATER PROJECT | 2-12 |
| THE FLOOD MANAGEMENT SYSTEMS | 2-12 |
| The Sacramento River Flood Management System | 2-13 |
| Sacramento River Flood Control Project | 2-13 |
| Sacramento River and Major and Minor Tributaries Flood Control Project | 2-14 |
| Sacramento River, Chico Landing to Red Bluff Bank Protection Project | 2-14 |
| Sacramento River Bank Protection Project | 2-14 |
| Butte Basin Plan of Flood Control | 2-16 |
| Sacramento River Flood Control System Evaluation ... | 2-17 |
| American River Flood Control Project | 2-17 |
| The San Joaquin River Flood Management System | 2-17 |
| | |
| CHAPTER 3. FACTORS INFLUENCING USES OF THE FLOODPLAIN | 3-1 |
| INTRODUCTION | 3-1 |
| ECONOMIC AND SOCIAL FACTORS | 3-2 |
| CONTINUING CONCERNS | 3-4 |
| THE NFIP | 3-4 |
| INADEQUATE FLOODPLAIN MAPS | 3-5 |
| Mapping | 3-5 |

| | |
|--|------|
| Hydrology Issues | 3-6 |
| UNLIMITED HYDRAULIC IMPACTS | 3-6 |
| DEFERRED CHANNEL MAINTENANCE | 3-6 |
| DIFFICULTY IN FUNDING PROJECTS | 3-7 |
| FUTURE FLOODPLAIN MANAGEMENT | 3-7 |
| CHAPTER 4. EXISTING CONDITIONS | 4-1 |
| SYSTEM-WIDE CONTEXT AND CONDITIONS | 4-1 |
| ECOSYSTEM STRUCTURE AND PROCESSES | 4-1 |
| FISH AND AQUATIC ECOSYSTEMS | 4-2 |
| PLANT COMMUNITIES, WILDLIFE, AND TERRESTRIAL ECOSYSTEMS | 4-4 |
| SOCIOECONOMICS | 4-4 |
| Demographics | 4-4 |
| Economics | 4-4 |
| LAND USE | 4-5 |
| Urban Lands | 4-5 |
| Agricultural Land Use | 4-5 |
| Prime and Unique Farmlands | 4-6 |
| Agricultural Economics | 4-6 |
| Wildlands and Conservation Lands | 4-7 |
| WATER SUPPLY | 4-8 |
| CULTURAL RESOURCES AND INDIAN TRUST LANDS | 4-10 |
| Cultural Resources | 4-10 |
| Indian Trust Assets | 4-11 |
| WATER RESOURCE DEVELOPMENT | 4-11 |
| SACRAMENTO RIVER BASIN | 4-12 |
| FISH AND AQUATIC ECOSYSTEMS | 4-12 |
| PLANT COMMUNITIES, WILDLIFE AND TERRESTRIAL ECOSYSTEMS | 4-13 |
| Historical Perspective | 4-14 |
| Natural and Agricultural Communities | 4-14 |
| Waterfowl and Shorebirds | 4-15 |
| Existing Conditions | 4-15 |
| Natural and Agricultural Communities | 4-15 |
| Special-Status Species | 4-15 |
| Waterfowl and Shorebirds | 4-16 |
| SOCIOECONOMICS | 4-16 |
| Demographics | 4-16 |
| Agricultural Economics | 4-16 |
| LAND USE | 4-16 |
| Urban Lands | 4-16 |

| | |
|--|------|
| Agricultural Land Use | 4-17 |
| Wildlands and Conservation Lands | 4-18 |
| WATER SUPPLY | 4-18 |
| CULTURAL RESOURCES | 4-18 |
| Prehistoric Resources | 4-19 |
| Historic Resources | 4-19 |
| WATER RESOURCES DEVELOPMENT | 4-19 |
| Sacramento River Flood Control Project and Seasonal Flood Detention Storage in Separately-authorized Multipurpose Reservoirs | 4-20 |
| Butte Basin Overflow Area | 4-21 |
| Sacramento River and major and Minor Tributaries Flood Control Project | 4-22 |
| Sacramento river, Chico Landing to Red Bluff Bank Protection Project | 4-22 |
| Sacramento River Bank Protection Project | 4-22 |
| SAN JOAQUIN RIVER BASIN | 4-23 |
| FISH AND AQUATIC ECOSYSTEMS | 4-23 |
| PLANT COMMUNITIES, WILDLIFE, AND TERRESTRIAL ECOSYSTEMS | 4-24 |
| Historical Perspective | 4-24 |
| Natural and Agricultural Communities | 4-24 |
| Waterfowl and Shorebirds | 4-25 |
| Existing Conditions | 4-25 |
| Natural and Agricultural Communities | 4-25 |
| Special-Status Species | 4-26 |
| Waterfowl and Shorebirds | 4-26 |
| SOCIOECONOMICS | 4-26 |
| Demographics | 4-26 |
| Agricultural Economics | 4-27 |
| LAND USE | 4-27 |
| Urban Land Use | 4-27 |
| Agricultural Land Use | 4-27 |
| Wildlands and Conservation Lands | 4-28 |
| WATER SUPPLY | 4-28 |
| CULTURAL RESOURCES AND INDIAN TRUST ASSETS | 4-29 |
| Prehistoric Resources | 4-29 |
| Historic Resources | 4-29 |
| WATER RESOURCES DEVELOPMENT | 4-29 |

| | |
|---|------|
| CHAPTER 5. FUTURE WITHOUT-ACTION TRENDS | 5-1 |
| ECOSYSTEM STRUCTURE AND PROCESS | 5-1 |
| LAND USE | 5-2 |
| SACRAMENTO RIVER BASIN | 5-3 |
| SAN JOAQUIN RIVER BASIN | 5-3 |
| TULARE LAKE BASIN | 5-4 |
| DEMOGRAPHICS | 5-4 |
| WATER DEMAND AND SUPPLY | 5-5 |
| SACRAMENTO RIVER BASIN | 5-8 |
| SAN JOAQUIN RIVER BASIN | 5-8 |
| TULARE LAKE BASIN | 5-8 |
| FLOOD MANAGEMENT INFRASTRUCTURE | 5-9 |
| | |
| CHAPTER 6. FLOODING AND RELATED ENVIRONMENTAL RESOURCE PROBLEMS | 6-1 |
| PROBLEM IDENTIFICATION PROCESS | 6-1 |
| TECHNICAL SUPPORT GROUPS | 6-1 |
| OTHER ORGANIZATIONS AND INDIVIDUALS | 6-2 |
| SACRAMENTO RIVER FLOODING AND RELATED ENVIRONMENTAL PROBLEMS | 6-2 |
| FLOODING PROBLEMS | 6-2 |
| RELATED ENVIRONMENTAL PROBLEMS | 6-5 |
| SAN JOAQUIN RIVER FLOODING AND RELATED ENVIRONMENTAL PROBLEMS | 6-8 |
| FLOODING PROBLEMS | 6-9 |
| RELATED ENVIRONMENTAL PROBLEMS | 6-11 |
| | |
| CHAPTER 7. OBJECTIVES, PRINCIPLES AND CONSIDERATIONS, AND MEASURES | 7-1 |
| GENERAL PLANNING OBJECTIVES | 7-1 |
| OBJECTIVES TO IMPROVE FLOOD RISK MANAGEMENT THROUGHOUT THE SYSTEMS | 7-1 |
| OBJECTIVES TO INTEGRATE PROTECTION AND RESTORATION OF ECOSYSTEMS INTO FLOOD DAMAGE REDUCTION MEASURES | 7-2 |
| OBJECTIVES TO RESOLVE POLICY ISSUES AND ADDRESS LIMITED INSTITUTIONAL ISSUES | 7-2 |
| GENERAL PLANNING PRINCIPLES AND CONSIDERATIONS | 7-3 |
| GENERAL PLANNING PRINCIPLES | 7-3 |
| GENERAL PLANNING CONSIDERATIONS | 7-4 |
| MEASURES | 7-6 |
| SOURCES OF POTENTIAL MEASURES | 7-7 |

| | |
|--|------|
| INITIAL SCREENING OF POTENTIAL MEASURES | 7-8 |
| TYPES OF MEASURES AND USE OF MEASURES | 7-8 |
| CHAPTER 8. FRAMEWORK FOR FORMULATING THE MASTER PLANS | 8-1 |
| FRAMEWORK OVERVIEW | 8-1 |
| FRAMEWORK DESCRIPTION | 8-2 |
| PUBLIC AND STAKEHOLDER INVOLVEMENT | 8-2 |
| ESTABLISH THE EVALUATION BASELINE | 8-2 |
| SYSTEM EVALUATION STEPS | 8-3 |
| Step 1 - Evaluate the Originally intended Flood Management Function | 8-3 |
| Step 2 - Identify System Constraints | 8-3 |
| Step 3 - Address Residual Flood Risk | 8-3 |
| FORMULATE COMPLETE PROJECTS AND DESCRIBE OUTPUTS | 8-3 |
| CHAPTER 9. IMPLEMENTATION STRATEGY | 9-1 |
| PARTNERSHIPS AND PROGRAMS | 9-1 |
| SPIN-OFF PROJECTS | 9-1 |
| CRITERIA FOR SPIN-OFF PROJECTS | 9-2 |
| PROCESS FOR INITIATING SPIN-OFF PROJECTS | 9-2 |
| SELECTED SPIN-OFF PROJECTS IN DEVELOPMENT | 9-2 |
| Chico Landing to Red Bluff, Section 1135 Project Proposal | 9-3 |
| U.C. Davis River Meander and Vegetation Model | 9-3 |
| EARLY IMPLEMENTATION PROJECTS | 9-4 |
| CRITERIA FOR EARLY IMPLEMENTATION PROJECTS | 9-4 |
| PROCESS FOR INITIATING EARLY IMPLEMENTATION PROJECTS | 9-4 |
| FULL PLAN IMPLEMENTATION | 9-5 |
| CHAPTER 10. POLICY ISSUES, INSTITUTIONAL BARRIERS, AND POTENTIAL CHANGES | 10-1 |
| INTRODUCTION | 10-1 |
| PUBLIC OUTREACH AND INVOLVEMENT | 10-1 |
| IDENTIFYING THE NEED | 10-1 |
| POLICY FOCUS GROUP MEETINGS | 10-1 |
| PREPARATION OF ISSUE STATEMENTS AND POTENTIAL RESOLUTIONS | 10-2 |
| ISSUE STATEMENTS AND POTENTIAL RESOLUTIONS | 10-2 |
| ECOSYSTEM RESTORATION, FLOOD DAMAGE REDUCTION, AND THE REGULATORY PROCESS | 10-2 |
| Insufficient Authority | 10-2 |
| Permit Compliance | 10-3 |

| | |
|---|----------|
| Ecosystem Restoration Conflicting With Flood Management | |
| Responsibilities | 10-3 |
| Increasing Floodplain and Floodway Capacity | 10-5 |
| Raising, Strengthening, and Protecting Levees | 10-7 |
| Bank Protection | 10-9 |
| Traditional versus Nontraditional Alternatives | 10-9 |
| Re-operating Existing Facilities | 10-10 |
| FLOOD RISK AND HYDRAULIC EFFECTS | 10-11 |
| Misunderstanding of Floodplain Delineations | 10-11 |
| Unreliability of Floodplain Designations | 10-13 |
| Need for Improved Local and Regional Flood Management | 10-15 |
| Disincentives for Alternative Flood Management Approaches | 10-17 |
| Need for Standards for Assessing and Mitigating Hydraulic Impacts | 10-18 |
| PLANNING/PROJECT DEVELOPMENT PROCESSES (INCLUDING NATIONAL ECONOMIC DEVELOPMENT) | 10-19 |
| Federal Planning/Project Development Processes | 10-19 |
| State Planning/Project Development Processes | 10-20 |
| CHAPTER 11. PHASE II STUDY TASKS | 11-1 |
| PUBLIC INVOLVEMENT | 11-1 |
| REVISE PHASE 1 INFORMATION | 11-1 |
| GIS DEVELOPMENT AND ANALYSIS | 11-2 |
| PLAN FORMULATION AND EVALUATION | 11-2 |
| ENVIRONMENTAL STUDIES | 11-3 |
| ECOSYSTEM FUNCTIONS MODEL | 11-3 |
| ENVIRONMENTAL IMPACT ASSESSMENT | 11-4 |
| ENVIRONMENTAL BENEFITS ANALYSIS | 11-4 |
| TRADE-OFF ANALYSIS | 11-4 |
| ENVIRONMENTAL COMPLIANCE | 11-5 |
| FEDERAL AND STATE REQUIREMENTS | 11-5 |
| SOCIOECONOMIC STUDIES | 11-6 |
| ECONOMIC IMPACTS MODEL | 11-6 |
| ECONOMIC ANALYSIS | 11-7 |
| LOCAL FINANCIAL PLAN | 11-8 |
| LAND USE STUDIES | 11-8 |
| SOCIAL STUDIES | 11-8 |
| ECONOMIC REPORT | 11-8 |
| ENGINEERING ANALYSES | 11-8 |
| SURVEYING | 11-8 |

| | |
|---|----------------|
| H&H STUDIES | 11-9 |
| GEOTECHNICAL ANALYSES | 11-9 |
| STRUCTURAL ANALYSES | 11-10 |
| CIVIL ANALYSES | 11-10 |
| COST ESTIMATES | 11-10 |
| ENGINEERING BASIS OF DESIGN | 11-10 |
| REAL ESTATE ANALYSES | 11-11 |
| REAL ESTATE STUDIES | 11-11 |
| RIGHTS-OF-ENTRY | 11-11 |
| PREPARATION OF RECONNAISSANCE APPRAISALS | 11-11 |
| PREPARATION OF GROSS APPRAISAL | 11-11 |
| PRELIMINARY ATTORNEY'S OPINION OF COMPENSABILITY .. | 11-12 |
| PROJECT MANAGEMENT | 11-12 |
| PROJECT MANAGEMENT PLAN (PMP) | 11-13 |
| TASK INTERRELATIONS | 11-13 |
| | |
| BIBLIOGRAPHY | BIBLIOGRAPHY-1 |
| | |
| GLOSSARY OF AGENCIES AND ORGANIZATIONS | Glossary-1 |